User manual for

Exalto

Parts • **Wipers** • Propulsion

Exalto windshield wiper

Type 223 BD 12/24 Volt

Catalogue no. 2165.30/32/35/40 (12 Volt)

Catalogue no. 2166.3032/35/40 (24 Volt)

version 7 - 2011

Safety

Although Exalto windshield wipers are easy to install, a fair amount of technical knowledge (mechanical and electrical) is required of the technician. Consult the manual or your vendor in case of doubt on installation or functioning.

Safety symbols

! An exclamation mark in front of the text indicates, if a procedure is executed incorrectly, injury or damage may occur

Dangers

The installation and use of Exalto wipers doesn't inflict any personal dangers or damage, provided that installation is done according to the requirements.

- Never remove covers or other safety provisions, unless maintenance is being performed and all safety requirements are obeyed.
- The installer must provide all necessary covers.
- ! Always isolate the electrical circuit when performing maintenance. Prevent the installation from being started (accidentally) by others.

Safety provisions

Safety provisions protect the user against contact with moving, electrical or hot parts. Some of them must be provided by the installer. There are several safety provisions:

- ! Cover or panel (compelled): covers moving parts and electrical connections. The installer MUST provide a self-made cover or place the wiper behind a panel.
- Make sure the wiper has enough ventilation when placing it behind a panel or cover.
- Place a fuse (see specifications) in the main cable.

Safety requirements

Before the Exalto wiper is installed, we strongly recommend the following:

- Read the entire manual before installation.
- Keep your working environment as well as the wiper parts clean.
- Check to be sure no parts are missing or damaged.
- Use only well maintained tools and have them within reach when installing.
- Handle the parts with care.
- Never install or maintain the wiper with the electrical voltage applied, unless this is specifically mentioned in the manual.
- Clear your tools after installation.

Use of the manual

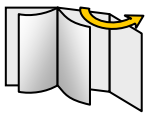
Read the entire manual before installation. In this manual you will find the following expressions and symbols:

Hint!
Gives you advice on how to perform a task more easily.

Attention!
Alerts you to possible problems and safety warnings.

Careful!
Warns if the product can be damaged when working carelessly.

Warning!
You could hurt yourself or damage the product severely.



At the back of the manual
Look at the back of the manual for a drawing.

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1 Introduction

With this user manual we want to guide you in the installation and use of the Exalto windshield wiper. Follow all instructions and install all safety provisions.

1.1 Introduction

The Exalto windshield wipers are especially designed to keep working even with the most extreme weather conditions at sea. All external parts are made of corrosion resistant materials. The housing of the self-lubricating bearings is made of bronze. All arms and blades have a black, weather-resistant coating, to prevent reflection of the sunlight.

!

Wiper type 223 BD is designed to be mounted in the bulkhead. The wiper arc is adjustable from 40° to 90° with steps of 5°. Standard the 223 BD can be supplied for a bulkhead thickness of 20, 35, 50 or 75 mm. The pantograph arms are adjustable in length, to set the wipe area accurately. The motor of the 223 BD is not insulated; and has a negative earth.

1.2 Environmental factors

In the wiper, materials are used that are harmful for the environment (e.g. copper). Upon disposal of the wiper, parts can be re-used or recycled. No harmful materials are released when using or disassembling the wiper.

1.3 Modified use and guarantee conditions

All modifications or defects in the product are subject to the Orgalime General Conditions of Sale. Contact your vendor if you want to use Exalto wipers for a non-maritime environment or for another application, or in case of any doubt.

2 Technical data

2.1 General

- Product ..... Exalto windshield wiper
- Types ..... 223 BD – 12 Volt and 24 Volt
- Catalogue numbers 12V 2165.30/32/35/40
- Catalogue numbers 24V 2166.30/32/35/40

2.2 Electrical data 12 Volt

- Torque (max.) ..... 23 Nm
- Voltage ..... 12 Volt
- Current ..... 3 A
- Power consumption (max.) ..... 36 W
- Number of revolutions ..... Low 38 rpm, high 59 rpm
- Recommended cable ..... 5 wires, 1½ (16 g) or 2½ mm^2 (14 g)
  ..... up to 10 m long
- Recommended fuse ..... 6 A slow blow
- Grounding ..... Not insulated, negative earth

2.3 Electrical data 24 Volt

- Torque (max.) ..... 23 Nm
- Voltage ..... 24 Volt
- Current ..... 1.5 A
- Power consumption (max.) ..... 36 W
- Number of revolutions ..... Low 35 rpm, high 56 rpm
- Recommended cable ..... 5 wires, 1½ (16 g) or 2½ mm^2 (14 g)
  ..... up to 10 m long
- Recommended fuse ..... 4 A slow blow
- Grounding ..... Not insulated, negative earth

2.4 Mechanical data

- Dimensions ..... l x w x h = 173 x 107 x 100 mm
- Bearing diameters ..... Drive shaft Ø 20 / support shaft Ø 8 mm
- Mounting ..... In bulkhead (20, 35, 55 or 75 mm)
- Bearing ..... Bronze housing, self-lubricating
- Wiperarms ..... Model PU up to 750 mm
- Wiperblades ..... Up to 800 mm
- Wipe arc ..... Wipe arc disc 40°-90° adjustable per 5°
- Weight ..... approx. 2.3 kg

3. Installation

Read the chapter on safety. Check before installation if all parts are present and undamaged. In case of errors, contact your vendor.

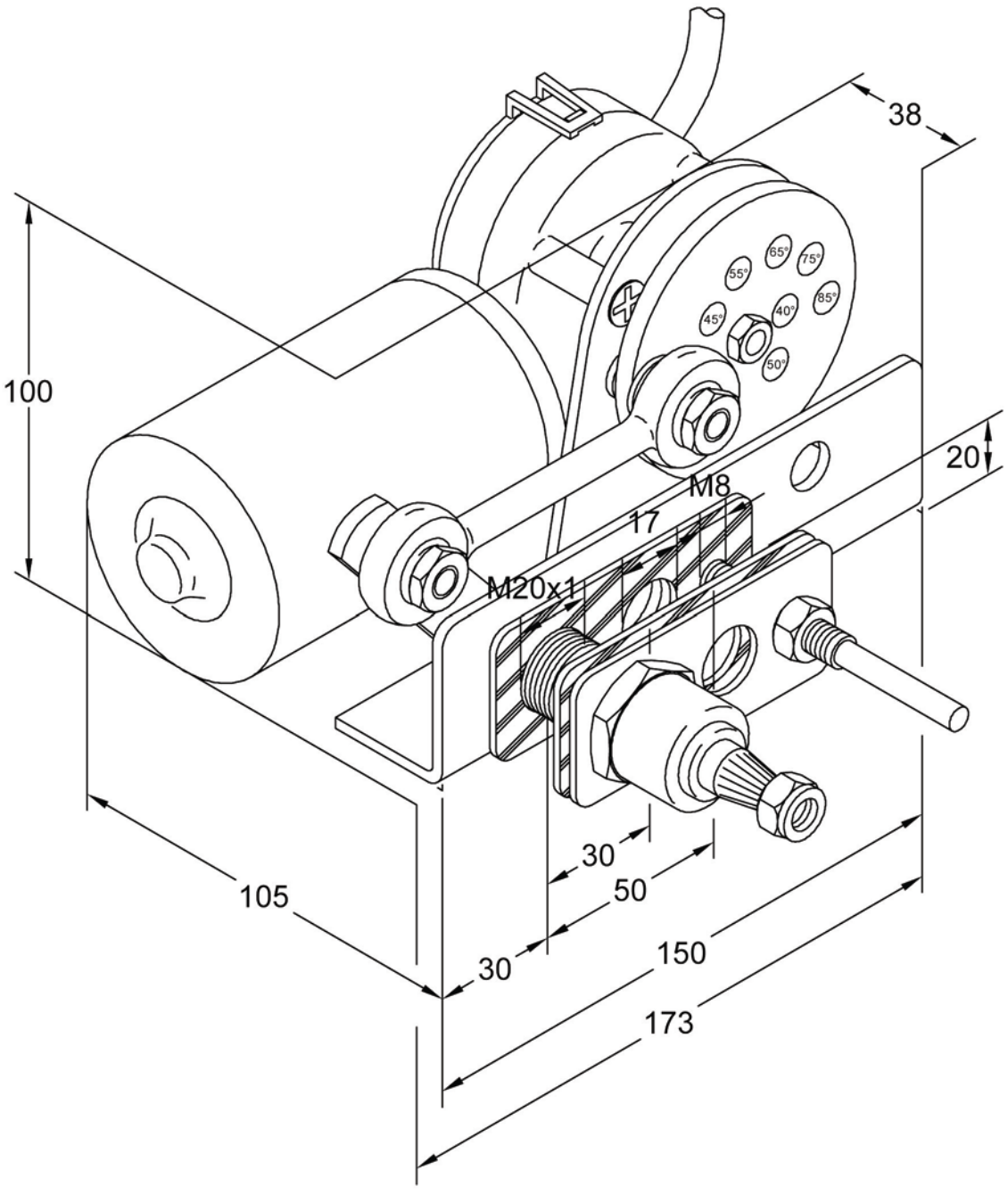
3.1 Preparation

The complete wiper, with packaging, can be handled and transported by hand. Leave the wiper in the packing, until you are ready to install it; this to reduce the risk of damage. Make sure all parts, tools and other means are ready.

3.2 Installation of mechanical parts

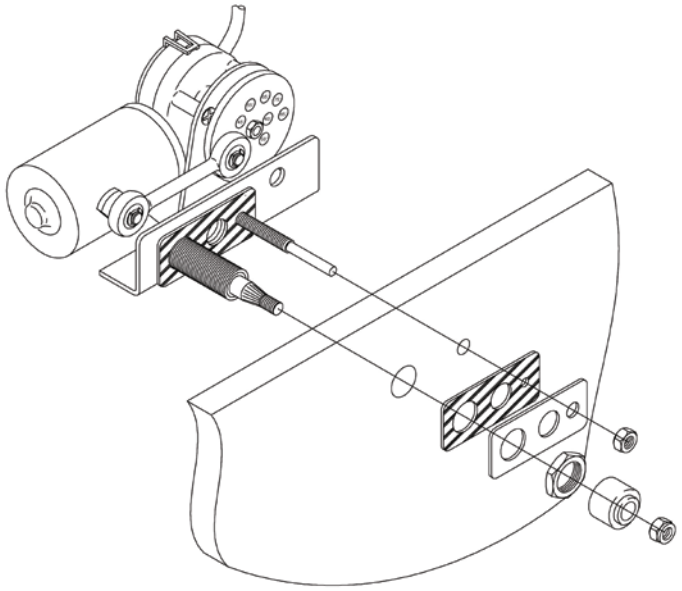
1. If your wiper is supplied with the wipe arc disc uninstalled, please follow steps 5.3 and 5.4 (pages 11-12) to set the wiping arc prior to installation.

   Determine the place where the wiper is to be installed. The dimensions are shown below. The wiper can be installed in any position.



Attention!

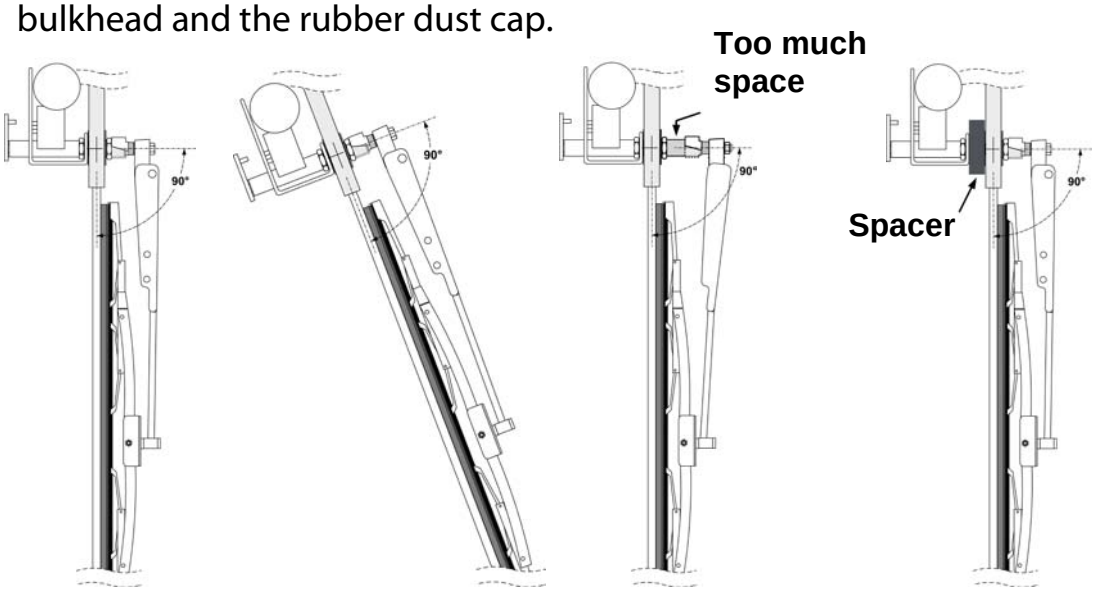
When installing the wiper, reserve space for a housing or cover.



tightening torque :	25.6 Nm / 18.88 ft.lbs	16.3 Nm / 12.02 ft.lbs

2. Place the windshield wiper in the pre-drilled holes of the bulkhead (see above figure). A nitrile plate must be placed at both sides of the bulkhead.

3. To ensure that the arm has the right spring pressure, install the wiper arm in such a way that the shaft makes a 90° angle with the window and fuse a spacer from the inside when there is too much space between the bulkhead and the rubber dust cap.



Correct Correct Not Correct Correct

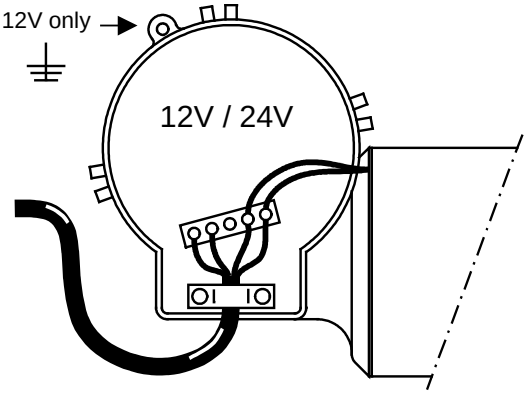
4. Do not fit the wiper arm before finishing the electrical connections.

3.3 Electrical installation

5. Install a wiper switch in the dashboard.

Wiring diagram 223 BD 12/24 Volt

Colours 12V	Colours 24V	Function	Pol
green	yellow	low speed	+
(see diagram)	black	minus/earth	-
brown	black/white	common leg	
black	white	selfparking	+
red	grey	high speed	+



SLOW BLOW FUSE: 6A for 12V

SLOW BLOW FUSE: 4A for 24V

6. Connect the wiper to the ship's electrical installation; see the schemes above. Use a cable consisting of 5 wires with cross-sections of at least 1½ mm^2 (16 g) up to a maximum of 10 m. Use larger cross-sections when using longer cables.

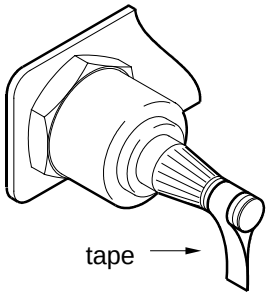
7. Place a slow blow fuse of 6 A (12 Volt) or 4 A (24 Volt) in the main cable.

8. Connect a switch to the wiper (refer to that specific manual for installation).

3.4 Final installation

9. Test the motor briefly. Wait until the motor stops after turning off the switch. If the motor is installed correctly and a switch with park feature is used, it will stop in the park position. The standard park position is shown in the figure under point 9.

   Hint!
   If you have doubts regarding the park position, make a vane with tape to simulate the position of the arms.

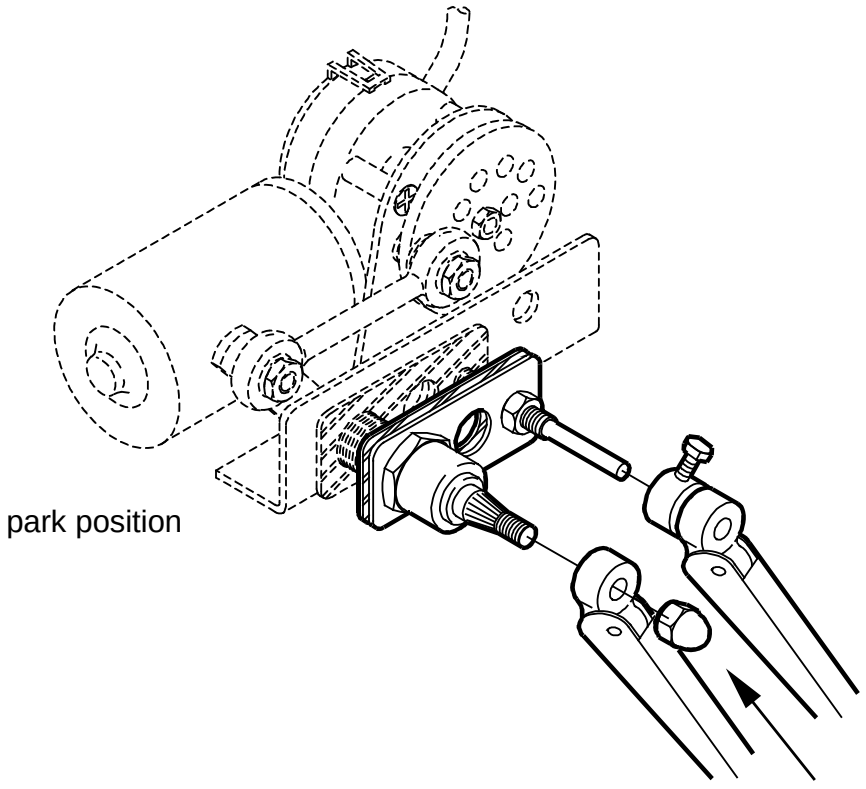


   Attention!
   The 223 BD is suitable for wiper arms model PU up to 750 mm with wiper blades up to 800 mm.

10. Place the wiper arm with the blade on the shafts. Fasten the nuts onto the shafts, but not too tight yet.

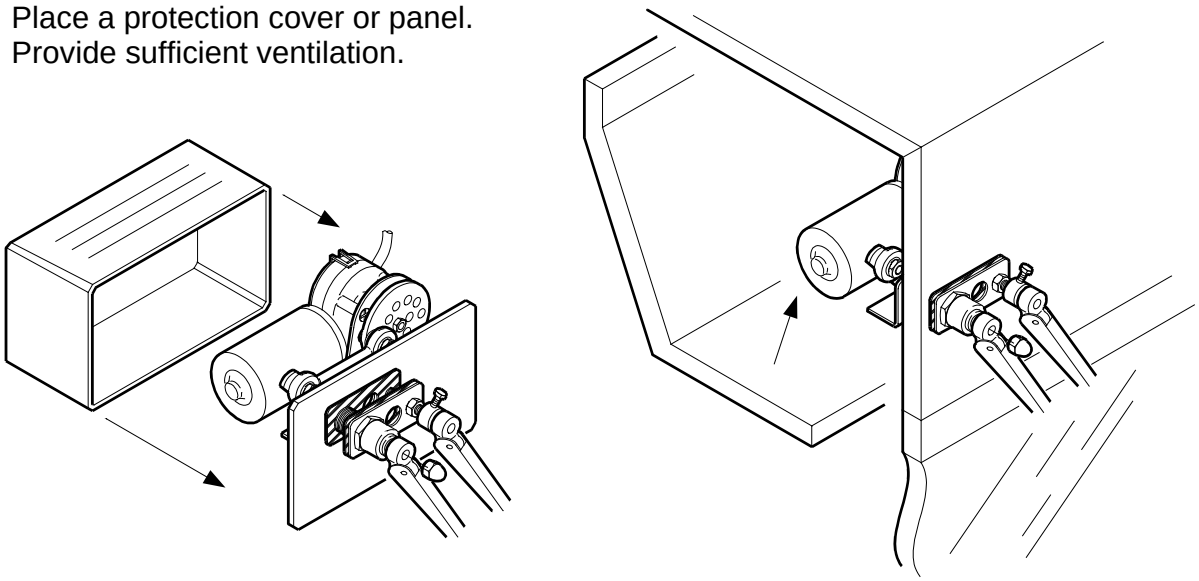
11. Test the motor again to check the wiped area.

12. If the wipe arc is correct, adjust the position and the length of the arm if necessary. Tighten the nuts properly now.



13. To complete the installation, the wiper must be enclosed by means of a panel or cover. Provide the wiper motor with sufficient ventilation.

Place a protection cover or panel.
Provide sufficient ventilation.



4 Operation and use

4.1 Preparation for first use

If the wiper has been installed and been adjusted, the system can be prepared for first use. We recommend a thorough inspection of the system to ensure proper operation.

Check:
… if there are no leaks where the shafts go through the bulkhead;
… if the wipe arc cleans the entire window;
… if the park position is correct.

If the wipe arc or the park position is wrong, adjust them again. Follow the procedure in section 5.3.

4.2 Use

All Exalto windshield wipers are provided with the following functions:

- low speed;
- high speed;
- self parking.

Don't use the wiper on a dry window; excessive wear of the blades and the motor may occur in this case.

Because of the big variety of wiper switches, we refer to the user manual of the installed switch to learn about the functions of that specific switch.

5 Maintenance

5.1 General maintenance

To keep the Exalto wiper in good condition, you are advised to:

- clean wiper arms and wiper blades with fresh water after every journey in salt water (to prevent salt from clogging moving parts);
- prevent running the wiper on a dry window.

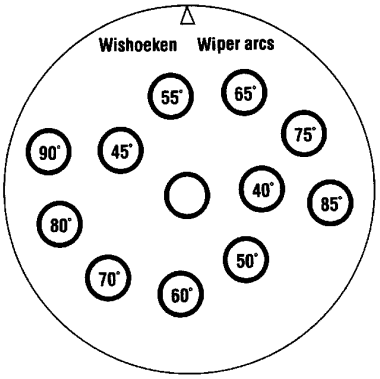
5.2 Servicing

As long as the wiper system functions normally and kept in good shape (see section 5.1), servicing the motor is not necessary. Check yearly (monthly when used intensively) if the wiper blades are worn. Replace blades when worn or when the blades leave many stripes across the glass. In case of failure or adjustments, have servicing done solely by qualified mechanics. In chapter 6, "Troubleshooting", a listing is given of possible problems.

5.3 Changing the wipe arc and park position

If the wiped area is not optimal, the wipe arc and park position can be changed. Always disconnect the power supply before opening the housing.

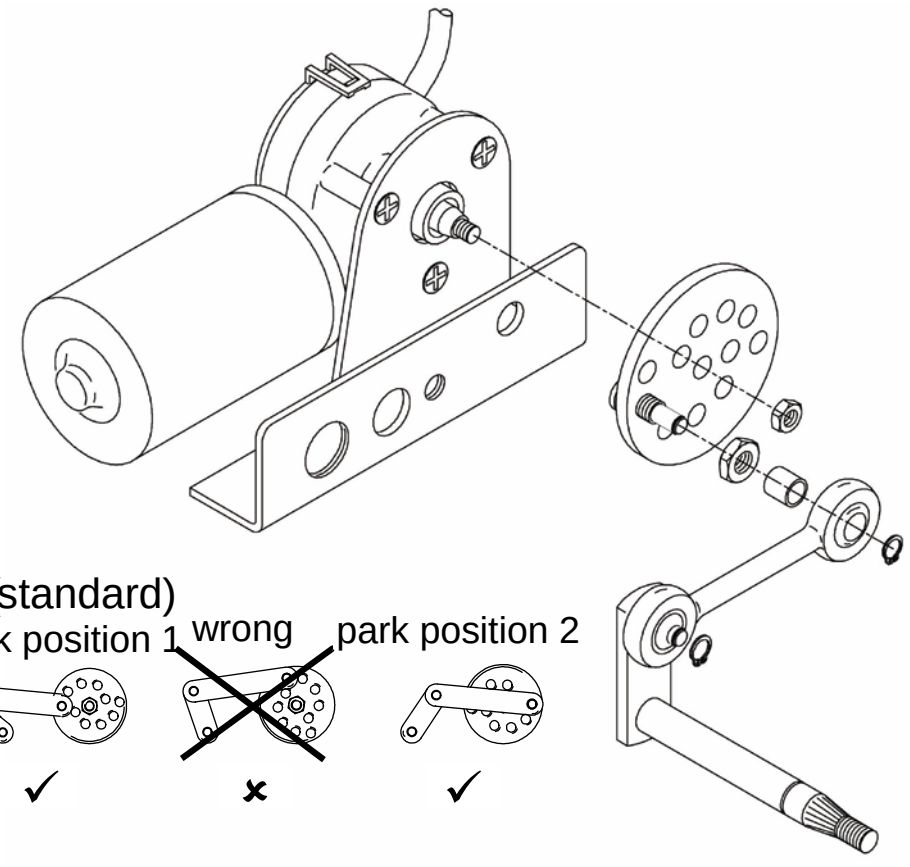
Adjusting the wipe arc



- Disconnect the power supply;
- remove the wiper from the bulkhead;
- remove the wipe arc disc (see figure on the right) from the motor-shaft;
- relocate the pin into the hole of the desired wipe arc (see section 5.4);
- fasten the nut on the pin not too tight (max. 9.78 Nm / 7.21 ft.lbs), to prevent damage of the plastic spacer;
- run the motor briefly to park it;
- move the disc to the desired park position (see the text below).

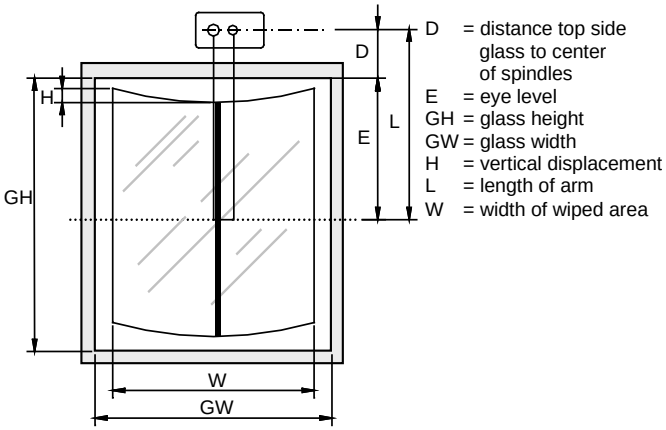
Adjusting the park position

- Place the disc on the shaft, parking right or left (see the drawing in paragraph 3.4, and the next page for reference);
- place the disc in such a way that the connection lever forms an almost straight line with the pin and the central hole of the disc (see the drawing below);
- tighten the disc well;
- mount the wiper-motor assembly;
- adjust the wiper arm to the correct length, if necessary.

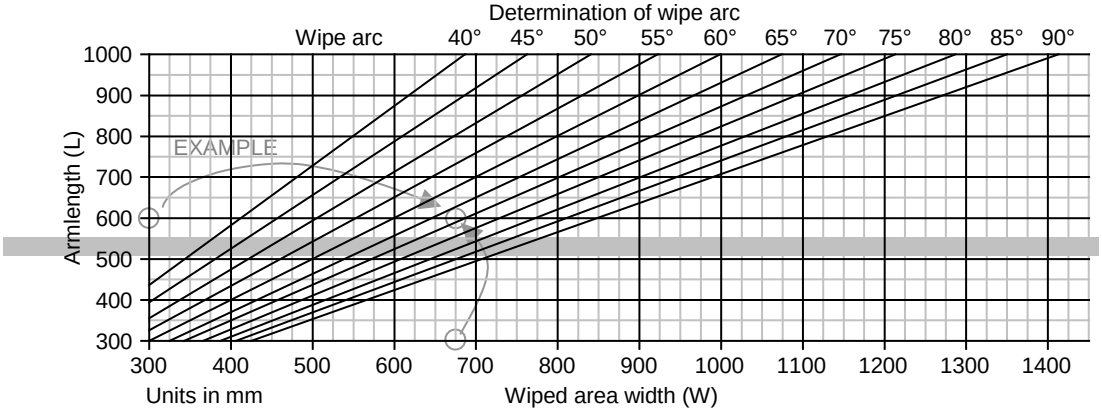


5.4 Rough determination of wipe arc and wiper blade

With this method the wipe arc, lengths of the wiper blade and wiper arm can be determined roughly. Contact your vendor to calculate your configuration more accurately.



- Determine length of panto-graph arm (L): ***L = E + D***
- get the maximum wiped area width (W): ***W = ±0.9 * GW***
- find the intersection of L and W in the diagram below;



- the wipe arc-line closest to the intersection, shows the wipe arc;
- find in the table below the vertical displacement of the blade (H);

Determining the vertical displacement of the wiper blade

Armlength (L)		300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
Wipe arc	40°	19	21	25	26	30	34	37	40	43	45	48	51	54	57	60
	45°	23	27	30	35	38	42	46	50	53	57	61	65	68	72	76
	50°	26	33	36	43	47	52	56	61	66	70	75	80	84	89	94
	55°	34	40	45	51	57	62	66	74	79	85	90	96	102	107	113
	60°	40	47	54	60	67	74	80	87	94	100	107	114	121	127	134
	65°	47	55	63	71	79	86	94	102	110	117	125	133	141	149	157
	70°	55	63	73	81	90	100	109	118	127	136	145	154	163	172	181
	75°	62	73	83	93	104	114	124	135	145	155	165	176	186	196	207
	80°	70	82	94	105	117	129	140	152	164	175	187	199	211	222	234
	85°	79	92	105	119	132	145	158	171	184	197	210	223	236	250	263
	90°	86	103	117	132	146	161	176	190	205	220	234	249	264	278	293

Units in mm — Vertical displacement of the blade (H)

- Now the length of the wiper blade can be calculated:
  Length of wiper blade = 0.9 * 2 * (E - H)

5.5 Disassembly and assembly

! To prevent injuries when disassembling: disconnect the wiper from the power supply. Keep all necessary tools within reach and remember the chapter on safety. Provide a protective packaging, if you're going to stock or transport the wiper.

5.5.1 Removing the wiper assembly from the bulkhead

1. Disconnect all the electric connections of the wiper.
2. Remove the wiper arms.
3. Remove the nuts (5, 23, 21) and plates (19, 20) on the outside.
4. Remove the wiper from the bulkhead.
5. If you want to replace the wiper, follow the instructions of chapter 3.

5.5.3 Disassembling the wipe arc disc

1. Disconnect all the electric connections of the wiper.
2. Remove the wiper from the bulkhead; (see 5.5.1).
3. Unscrew the nut (5) on the motor shaft and remove the disc (4).
4. For adjusting the wipe arc and replacing, follow the instructions of section 5.3.

5.5.4 Removing the motor from the wiper assembly

1. Disconnect all the electric connections of the wiper.
2. Disassemble the wipe arc disc (4) (see 5.5.2).
3. Unscrew the motor and remove it.
4. When replacing, screw the motor on the housing. Follow the instructions of section 5.3 to install the wipe arc disc in the correct park position.

6 Troubleshooting

In this chapter, several malfunctions are mentioned combined with possible causes. Please leave servicing to qualified mechanics.

6.1 Wiper does not work after switching on

- Possible causes:
  1. Wiper switch is not working properly.
  2. Burned fuse.
  3. Electrical connections are incorrect or damaged.
  4. The wiper motor has failed.
- Solutions:
  1. Test and replace it.
  2. Check if the current is (and keeps being) too high. (See solution 1).
  3. Measure the voltage across the motor and check all connections if there is none.
  4. Replace the motor and check for drag or a high current.

6.2 Wiped area or park position not correct

- Possible causes:
  1. The wiper arms were placed without parking the motor first.
  2. The wipe arc is set wrong or changed due to high loads (e.g. spring pressure of arms too high, drag).
  3. The wires are connected incorrectly.
- Solutions:
  1. Remove the wiper arms. Run the motor shortly to park it and re-install the arms according to chapter 3.
  2. Determine the wipe arc if needed (see section 5.4) and set the wipe arc again (see chapter 5.3).
  3. Check and reconnect the wiring (see the scheme in section 3.3).

6.3 Motor runs, but arms do not move

- Possible causes:
  1. Mechanical joints are loose.
  2. Parts are broken.
  3. Grooves of shafts are worn.
- Solutions:
  1. Check if the arms are well fastened. If not, open the housing (follow instructions of chapter 5) and check all joints and parts to see if they are loose, broken or worn.

7 Declaration of conformity

MANUFACTURER'S DECLARATION

In accordance to Appendix II sub B of Directive 89/392/EEG (Machines)

Exalto B.V.
Nijverheidsstraat 12
3371 XE Hardinxveld-Giessendam
The Netherlands
T +31 (0)184-61.58.00
F +31 (0)184-61.40.45

hereby declares that

Exalto windshield wiper type 223 BD

… is intended to be built into another machine or as a component, or is to be integrated with other machines to a machine where Directive 89/392/EEG applies to;

… **does not** fully comply to the requirements of mentioned Directive;

… complies to the following harmonised standards:

Pleasure yachts

- NEN-EN-ISO 10133 Extra-low voltage D.C. installations (1997) (regarding colour codes)

…and declares that the sub-assembly in question shall not be set into operation until the complete machine, into which the sub-assembly is fitted, shall be complete and conforms to all aspects of Directive 89/392/EEG.

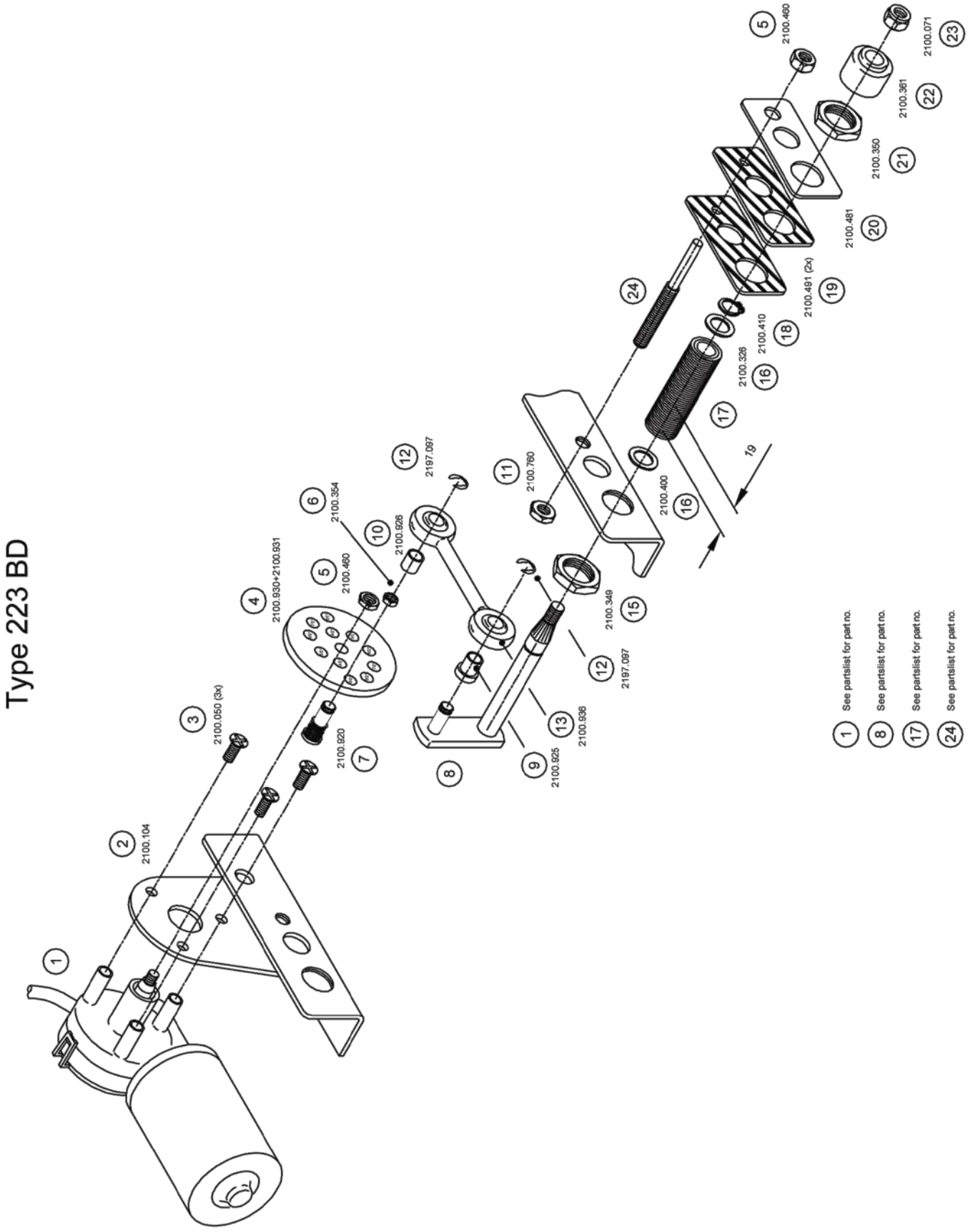
Hardinxveld-Giessendam
4-22-2011 (m-d-y)

8 Parts list

No	Qua	Part	Dimensions	Cat. no.
1	1	Motor 12 V 23 Nm	180x105x85	2100.415
		Motor 24 V 23 Nm	180x105x85	2100.425
2	1	Wiper housing for 223 BD	150x90x40	2100.104
3	3	Cross recessed countersunk head screw (DIN 965)	M6x16	2100.050
4	1	Wipe arc disc	Ø70x5	2100.930
	1	Sticker for Wipe arc disk		2100.931
5	2	Nut s.s. (DIN 934)	M8	2100.460
	1	Nut s.s.	M8*5	2100.355
6	1	Nut s.s.	M10*6.5	2100.354
7	1	Connecting pin	M8x26	2100.920
8	1	Shaft with lever, bh 20 mm	Ø12x102	2100.364
		Shaft with lever, bh 35 mm	Ø12x117	2100.360
		Shaft with lever, bh 55 mm	Ø12x137	2100.366
		Shaft with lever, bh 75 mm	Ø12x157	2100.368
9	1	Sleeve-bearing bush, plastic	13x14	2100.925
10	1	Bearing bush	10x10	2100.926
11	1	Nut s.s. flat	M8x4	2100.760
12	2	Retaining ring	Ø 6mm	2197.097
13	1	Push rod	110x24x10	2100.936
15	1	Nut s.s.	M20	2100.349
16	2	Plain washer s.s.	18x12x1	2100.400
17	1	Bearing house, bh 20 mm	M20x65	2100.326
		Bearing house, bh 35 mm	M20x80	2100.321
		Bearing house, bh 55 mm	M20x100	2100.327
		Bearing house, bh 75 mm	M20x120	2100.328
18	1	Retaining ring for shaft	12x4	2100.410
19	2	Gasket, rubber	90x45x3	2100.491
20	1	Gasket, s.s.	90x45x3	2100.481
21	1	Nut s.s.	M20	2100.350
22	1	Dust cap, rubber	Ø26x20	2100.361
23	1	Nut s.s., nylock A4	M8	2100.071
24	1	Support shaft, bh 20 mm	M8x75	2100.446
		Support shaft, bh 35 mm	M8x90	2100.441
		Support shaft, bh 55 mm	M8x110	2100.447
		Support shaft, bh 75 mm	M8x130	2100.448

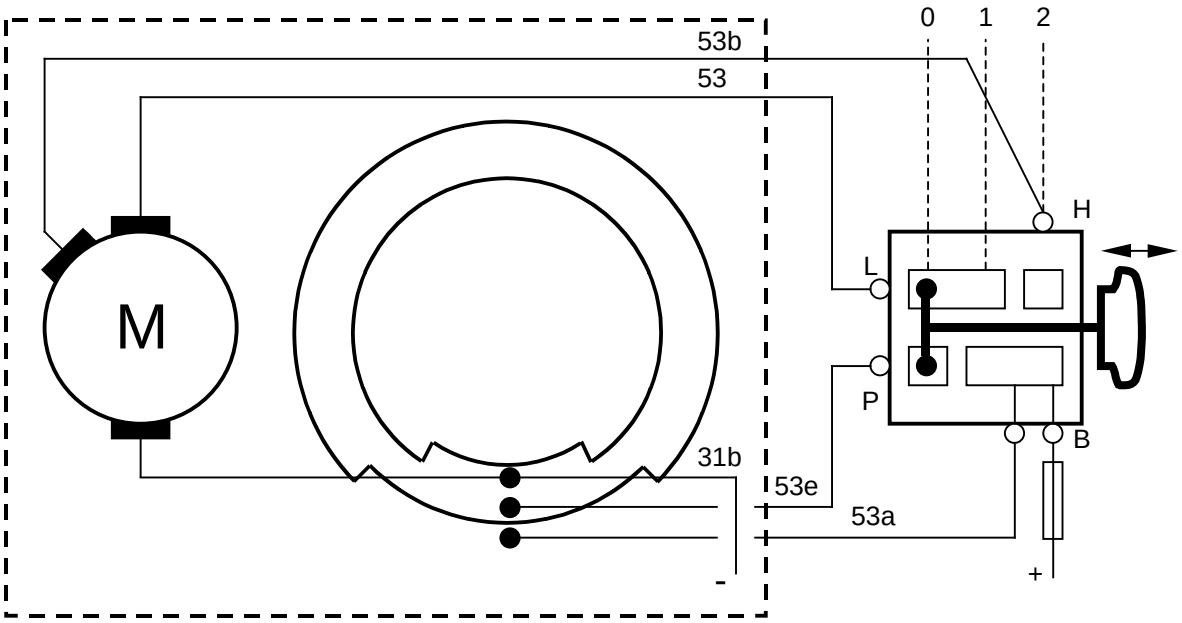
9 Drawings and Schemes

9.1 Assembly overview



9.2 Internal wiring diagram

The following diagram explains the way the wiper motor works.



Function	Polarity	Motor code	Switch code	Cable 12/24V
high speed	+	53b	H	red/grey
low speed	+	53	L	green/yellow
earth	-	31b		-/black
common leg		53e	P	brown/bl-wh
Self-parking	+	53a	B	black/white

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